

# PhD opportunity on megathrust earthquakes at Heidelberg University, Germany

## PhD Position in Earth Sciences (75%, 36 months)

### Heidelberg University – Institute of Earth Sciences, Research Group “Geodynamics”

The University of Heidelberg invites applications for a doctoral researcher position (75%, 36 months) within the DFG-funded project:

#### “Frictional heating and magnetic fingerprints of megathrust earthquakes: insights from the Japan Trench”

This project is funded by the **German Research Foundation (DFG)** and will be hosted in the **Research Group “Geodynamics” at the Institute of Earth Sciences**, Heidelberg University, Germany, which is also home to the **heiMAG laboratory for Earth Magnetism**. The PhD candidate will make full use of the state-of-the-art facilities at heiMAG and Earth Simulation Lab (Utrecht University), providing excellent opportunities for advanced rock magnetic and paleomagnetic analyses, as well as for rock deformation experiments.

#### Project background

In this project, you will investigate the conditions for rupture propagation toward the trench during great subduction earthquakes, as exemplified by the 2011 Tohoku-Oki event. We aim to evaluate the role of **coseismic frictional heating** in altering fault strength, structure, and mineralogy, with a particular focus on **magnetic fingerprints of fault rocks**.

The research combines:

- Microstructural and magnetic analyses of natural fault zone samples from the Japan Trench.
- Controlled laboratory deformation experiments on comparable sediments.
- Assessment of the role of **stress, fluids, and strain localisation** in shaping magnetic properties.

This innovative approach will provide fresh insights into frictional heating and fault weakening processes during megathrust earthquakes and their role in promoting shallow slip toward the trench.

#### Your profile

We are looking for a highly motivated and **independent** candidate with:

- A recent Master’s degree (or equivalent) in **geosciences, earth sciences, or a related field**.
- Background knowledge in at least one of the following: **rock magnetism, structural geology, tectonics, fluid–rock interaction, or rock physics/deformation experiments**.
- Strong ability to work independently while also engaging in collaboration within an international team.
- Interest in interdisciplinary work combining laboratory experiments, field data, and theoretical concepts.
- Good communication skills in English (spoken and written)

#### What we offer

- A funded **doctoral position (TV-L 13, 75%) for 36 months**.
- Expected start date: **April 2026** or soon thereafter.
- The opportunity to work with unique samples collected during international scientific drilling campaigns.
- A stimulating research environment at the University of Heidelberg, with strong expertise in plate tectonics, geodynamics, structural geology, and paleomagnetism.

Funding is available, through the DFG SPP-IODP program, for a 3-year PhD project including costs for sampling, analysis, conference attendance and publications. There will be an opportunity to spend some time at one of the collaborating institutes during the PhD.

- **Active collaborations with international partners**, including:
  - JAMSTEC / Kochi Core Center (Japan)
  - High-Pressure & Temperature / Earth Simulation Laboratory, Utrecht University (Netherlands)
  - ANU Paleomagnetism Laboratory (Australia)

## Application

Please send your application as a **single PDF** including:

- **Cover letter** (statement of motivation, summarizing your scientific work and research interests; max. 2 pages).
- **CV**, including publications (if applicable).
- **Copies of degree certificates and transcripts.**
- **Contact details of two referees.**

Applications should be submitted by **31 October 2025** to [derya.guerer@geow.uni-heidelberg.de](mailto:derya.guerer@geow.uni-heidelberg.de)

For informal inquiries, please contact:

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## Selection process

In assessing the applications, special emphasis will be placed on **documented academic qualifications**, the **quality of the application materials**, the **candidate's motivation**, and their **personal suitability**. Candidates who have not yet officially graduated from their master's program are welcome to apply, provided they will have completed all degree requirements before the PhD program commences. If you are shortlisted, you may be asked to provide a letter from your institution or supervisor confirming your expected graduation date.

Interviews with the best-qualified candidates will be arranged in **November / December 2025**. We are looking to fill this position in early 2026. It is expected that the successful candidate will be able to **complete the project in the allocated time**.



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